# Chapter 3: Auditing Existing Resources and Programs

**Component 1**

*Purpose:* This program component identifies the most capable local agency to staff and administer the IDDE program, analyzes staffing and resource gaps, and searches for all available local resources and expertise that can be applied to the IDDE program.

*Method:* The key method used for this program component is a local IDDE "audit," which consists of external research, agency interviews, and interagency meetings to determine existing resources and program gaps. The audit typically looks at eight major factors needed to build an IDDE program:

- Profile of existing storm water and sewer infrastructure, as well as historical plumbing codes

- Existing legal authority to regulate illicit discharges

- Available mapping data and GIS resources

- Field staff availability and expertise

- Lab/monitoring equipment and analytical capability

- Education and outreach resources and outlets

- Discharge removal capability and emergency response

- Program budgeting and financing

*Desired Product or Outcome(s):* The desired outcome is an initial five-year IDDE program development plan over the current permit cycle. This will usually consist of an internal agreement on the lead agency, an initial scope of work, the first year budget, and a budget forecast for the entire permit cycle.

*Budget and/or Staff Resources Required:* The cost to conduct an audit depends on the size of the community, the degree of interagency cooperation, and the local budget process. Plan for less than one staff month for smaller communities, and up to three staff months for larger ones.

*Integration with Other Programs:* The audit is the best time to integrate the other five minimum management measures required under NPDES Phase II permits, including public education and outreach, public involvement, construction site runoff control, post-construction runoff control, and pollution prevention/good housekeeping for municipal operations.

## 3.1    Audit Overview

A community should conduct a quick audit of existing and needed capacity when developing its IDDE program. The audit helps develop realistic program goals, implementation strategies, schedules, and budgets to comply with NPDES permit requirements and improve water quality. The audit consists of external research, agency interviews and interagency meetings to determine existing resources and program gaps. The audit examines the community's current capabilities in eight topic areas: infrastructure profile, legal authority, available mapping, field staff experience, access to monitoring labs, education and outreach resources, discharge removal capability, and program budgets and financing.

Existing expertise is likely divided among multiple agencies (see Table 6) that should be contacted during the audit. Some of these agencies can become important partners in the development and implementation of the IDDE program, and contribute resources, program efficiencies and overall cost savings. The first agencies to interview are local emergency responders that already deal with spills, accidents, hazardous materials and sewage leaks that occur. In addition, it is worth getting to know the local agency responsible for plumbing code inspection during construction.

Table 7 provides representative examples of questions that the audit should ask to determine the needs and capabilities of a community associated with each program element.

| Table 6: Potential Local Agencies and Departments to Contact During an Audit | |
|---|---|
| **Audit Topic** | **Potential Agencies and Departments** |
| Infrastructure Profile | • Water and Sewer Authority       • Public Works |
| Existing Legal Authority | • Public Works<br>• Planning Department<br>• Parks and Recreation<br>• Environmental Protection       • Local Health Department<br>• Road Engineering<br>• Fire, Police or Rescue (Hazardous material responders) |
| Available Mapping | • Public Works<br>• Local Streets/Utilities       • Planning and Zoning<br>• Emergency Responders |
| Field Staff | • Public Works<br>• Environmental Compliance<br>• Development Review       • Watershed Groups<br>• Fire, Building, Health and Code Inspectors |
| Access to Lab Services | • Public Works<br>• Local College or University       • Drinking Water or Wastewater Treatment Plant<br>• Private Contract Monitoring Laboratories<br>• Health Department |
| Education and Outreach Resources | • Parks and Schools<br>• Water and Sewer Utility       • Community Liaison Office<br>• Civic and Watershed Groups |
| Discharge Removal Capability | • Fire, Rescue and Police<br>• Public Works       • Water and Sewer Utilities<br>• Private Plumbing Contractors |
| Program Budget and Financing | • Grants<br>• Fines<br>• Application fees       • Utility Fees<br>• Department Operating Budget |

| Table 7: Potential IDDE Audit Questions | |
|---|---|
| **Audit Topics** | **Questions** |
| Infrastructure Profile | • How many miles of streams and storm drains exist in the MS4?<br>• What is the area served by storm drains, sewers, and septics?<br>• What is the general age and condition of the infrastructure? |
| Existing Legal Authority | • Does an illicit discharge ordinance already exist?<br>• Does effective inter-departmental coordination and cooperation currently occur?<br>• Is there an existing reporting and tracking system (e.g., hotline)?<br>• Is the municipality involved with industrial storm water NPDES permit activities or pre-treatment programs? |
| Available Mapping Data | • Does current GIS data exist and does it include coverage of sanitary and storm sewer networks?<br>• Is there a centralized location for the data?<br>• Are digital and hardcopy versions of mapping data readily available? |
| Field Staff | • Are municipal staff available to walk stream miles and record information?<br>• Do municipal staff have the training and expertise to lead a field team?<br>• Are basic field supplies already owned by the municipality and available for use? |
| Access to Lab Services | • Does the municipality have access to an analytical laboratory?<br>• Is there a local university or institution that might be a willing partner?<br>• If yes, is the existing equipment and instrumentation considered to be safe, accurate and reliable?<br>• Are experienced municipal staff available to conduct analytical analyses?<br>• Does the lab and staff have the capability to conduct more sophisticated special studies? |
| Education and Outreach Resources | • Does the community already have an Internet website to post outreach materials?<br>• Are there regular community events that can be used to spread the message?<br>• Are good inter-agency communication mechanisms in place?<br>• Do outreach materials on illicit discharges already exist? |
| Discharge Removal Capability | • Who currently responds to spills, overflows and hazardous material emergencies?<br>• Are municipal staff properly equipped and trained to repair most common types of illicit connections?<br>• Does the municipality have clear authority identifying responsible parties?<br>• Is there a response time commitment to known and reported problems?<br>• Is there a list of pre-approved contractors to perform corrections? |
| Program Budget and Financing | • Is there a dedicated annual budget line item planned for the IDDE program?<br>• Are there cost-share arrangements/opportunities available with other departments?<br>• Have grant awards been awarded to the municipality for special studies associated with watershed restoration in the past? |

## 3.2    Develop Infrastructure Profile

The first part of the audit profiles current and historic storm water and sewer infrastructure in the community. The basic idea is to get a general sense of the magnitude of the task ahead, by looking at the size, age and condition of the storm drain system (and the sewers within the MS4 as well). Some useful planning statistics include:

- Number of storm drain outfalls

- Miles of storm drain pipe

- Total stream and channel miles

- Total area serviced by storm drains

- Total area serviced by sewers

- Total area serviced by septic systems

These statistics are extremely helpful in getting a handle on the total effort required to assess the overall system. Any data on the nature and age of storm drains and sewers can be useful (e.g., open vs. enclosed, young vs. old). The basic infrastructure statistics can be generated from a quick analysis of infrastructure and topographic maps. At this stage, ballpark estimates are fine; more detailed estimates can be developed later in the desktop analysis component.

It is also worth examining historic plumbing codes to determine what kinds of connections were allowed in the past.

Often, interviews with "old-timers" who remember past building codes and practices can provide insights about historical construction as to where illicit connections may be a problem.

## 3.3    Establish Legal Authority

This part of the audit examines whether a community currently has adequate legal authority to regulate illicit discharges through the following actions:

- Evaluate and modify plumbing codes[5]

- Prohibit illicit discharges

- Investigate suspected illicit discharges

- Require elimination of illicit discharges

- Carry out enforcement actions

The audit of existing legal authority entails a search and review of all existing ordinances that could conceivably bear on illicit discharge control, and interviews with the agencies that administer them. Some common local ordinances that may address illicit discharges are outlined in Table 8. Many communities already have regulations prohibiting specific illicit discharges, such as hazardous chemicals, litter or sewage. Often, public health ordinances may prohibit certain sewage discharges. Local utilities may have plumbing codes and staff capability to track down and remove illicit connections on the system they operate.

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[5] In some states such as NC, plumbing codes are established through a state process. In these cases, local governments typically need specific authority to adopt any local modifications, which can be difficult to obtain. In such states, it may be prudent for the storm water program managers of several local governments to organize as a single cooperative group to modify codes at the state level.

| Table 8: Codes and Ordinances with Potential Links to IDDE | |
|---|---|
| • Fire codes | • Pollution prevention permitting requirements |
| • Hazardous wastes/spill controls | • Restaurant grease regulations |
| • Health codes | • Septic system regulations |
| • Industrial storm water compliance | • Sewer/drain ordinances |
| • Litter control regulations | • Storm water ordinance |
| • Nuisance ordinances | • Street/highway codes |
| • Plumbing codes | |

To establish legal authority, communities will need to either develop a new IDDE ordinance or modify an existing ordinance that addresses illicit discharges. Language from existing ordinances that addresses illicit discharges should be incorporated or cross-referenced into any new IDDE ordinance to minimize conflicts and confusion. Furthermore, existing code ordinances may need to be amended or superceded to be consistent with the new IDDE ordinance.

In some instances, communities may want to consider collaborating with neighboring or nearby MS4s to develop ordinance language and legal authority, particularly if they share a common receiving water. Non-municipal permittees such as Departments of Transportation and special districts may also look to collaborate with municipal MS4s when considering ordinance language and legal responsibility.

## 3.4    Review Available Mapping

The third part of the audit looks at the coverage and quality of mapping resources available to support the IDDE program. Specifically, efforts should be made to see if a Geographic Information System (GIS) exists, and what digital mapping layers it contains. If a community does not possess a GIS, a community may choose to establish one (which can be quite expensive), or rely on available hardcopy maps. GIS and hardcopy maps are frequently

available from the following local agencies: planning, tax assessment, public works, parks and recreation, emergency response, environmental, transportation, utilities, or health. If a watershed extends beyond the boundaries of a community, it may be necessary to acquire mapping data from adjacent communities.

Non-local sources of mapping data include state and federal agencies and commercial vendors. EPA and state environmental regulatory agencies maintain lists of NPDES dischargers; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites; Resource Conservation and Recovery Act (RCRA) sites; and other industrial or hazardous material discharge sites. These sites are readily available as GIS layers[6]. Commercial vendors are good sources for low-altitude aerial photos of your community. These can be expensive but are often the best way to get a high-resolution recent 'snapshot' of the jurisdiction. Chapter 5 presents more detail on mapping layers needed for an IDDE program.

## 3.5    Availability of Field Staff

Field staff play a critical role in any IDDE program as they walk streams, assess outfalls, collect samples, respond to discharge complaints, and handle

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[6] Some readily available GIS layers provided by regulatory agencies can be incomplete and inaccurate (particularly with location information). Communities should use their IDDE program and the associated data collection efforts to update their local information associated with these databases.

enforcement. This part of the audit evaluates the availability of local staff to perform these functions, and their training needs. Phase I communities report that experienced field staff are a major factor in IDDE program success.

Experienced staff can be supplemented with support staff such as interns and local watershed groups, if they are properly trained (CWP, 2002). As part of the audit, program managers should investigate whether existing staff can be used or whether new hires are anticipated, and explore intern opportunities with local universities and community colleges. Any local staff with experience in water quality sampling or development inspection should be identified. Fire, building, health, safety and erosion control inspectors are all potential field crew draftees.

An initial estimate of the staff time needed for field crews should be made at this time. Phase I IDDE programs allocated a median of 1.0 person-year for field investigations, with a range of 0.1 to 10 person-years each year (CWP, 2002). Several communities utilized interns to assist with field monitoring and office work. Since many IDDE surveys are short term and seasonal, several communities hired or transferred employees to serve on field crews on a temporary basis. Many Phase I programs found it hard to precisely quantify actual staff time dedicated to IDDE field work because staff were assigned from many departments, or performed other unrelated tasks (building inspections, erosion and sediment control inspections, etc.).

## 3.6   Access to Laboratory Analysis

This part of the audit identifies the best options for laboratory analysis of water quality samples collected in the field. Four

basic options exist to get access to laboratory services, including:

1.   Contract services from a private lab

2.   Use existing lab facilities at local drinking water or wastewater treatment plants

3.   Partner with a local water and sewer district, university or community college

4.   Develop your own "in-house" monitoring and lab capability

The last three options may require purchasing special monitoring analysis equipment, depending on the water quality indicators ultimately selected. If a community is considering developing "in-house" monitoring capabilities, it will need to address quality control, training needs, safety, and hazardous waste disposal. At this point, a community simply wants to acquire data on costs, indicator parameters, quality control, and experience for each of the options being evaluated. Chapter 12 provides more detail on factors to consider when selecting lab analysis options.

## 3.7   Education and Outreach

The next part of the audit looks at existing educational and outreach resources in the community. To begin, look for other groups that are already involved in storm water or watershed education, including parks, schools, watershed groups, utilities and any other agencies performing this role. Next, look for the current tools the public can use to report water quality problems, such as complaint hotlines, websites or community liaison offices. When these exist, it may be possible to "piggy back" illicit discharge reporting at little additional cost. If reporting tools do not exist, program managers should look for opportunities to share start-up costs

with other agencies that may stand to benefit from improved community interaction (e.g., erosion and sediment control, sanitary sewer overflows, abandoned cars, etc.).

The audit should also look at community-wide events and education outlets to spread the IDDE message, such as fairs, festivals, earth day events, school presentations, and homeowner association meetings. For a complete review of how to craft an effective outreach and education plan, consult Pollution Source Control Practices (Schueler *et al.*, 2004). Excellent education and outreach materials have already been developed by Phase I communities that are available at little or no cost (see Chapter 9). Program managers should consult these resources and modify them as needed to meet their local needs.

## 3.8 Discharge Removal Capability and Tracking

This part of the audit evaluates local capacity to locate specific discharges, make needed corrections or repairs, and take any enforcement actions. These responsibilities are frequently split among several local agencies. For example, spills are often handled by the fire department hazmat response team, whereas dumping may be enforced by public works. Communities should always coordinate their IDDE program with any experienced hazmat response teams that exist. Similarly, local water and sewer utilities or private contractors that are in the business of repairing pipes should always be consulted. Their experience in specialized techniques such as dye or video testing of pipe interiors is essential for many illicit discharge source investigations. Alternatively, communities can opt to contract out many of these services.

Illicit discharges often occur due to "bad plumbing" connections. Therefore, the audit should identify key building inspectors to determine what, if any, procedures are in place to prevent these deficiencies. Lastly, where corrections to plumbing are required, communities should maintain a list of "pre-approved" plumbing contractors that can promptly and professionally repair the problem.

To ensure coordination, an up-to-date tracking system should be shared among all agencies involved.

## 3.9 Program Funding

The last part of the audit explores how much the local IDDE program will cost, and how it will be funded. This section provides some general budgeting guidance on the costs to expect for the eight program components. Overall IDDE program costs vary depending on the severity of the illicit discharge problem, the size of the community (and storm drain systems), and the IDDE program choices you make.

Planning level budget estimates can be derived for the eight IDDE program components in three ways. The first way is to look at the cost of IDDE program compliance for Phase I NPDES communities. These costs were assessed in a CWP (2002) survey, and can be used to budget overall annual costs for an IDDE program. Table 9 summarizes median program costs for selected Phase I IDDE program activities. The second technique is to construct unit cost budgets for each program component, based on an assumed level of effort. The third technique relies on EPA's overall average estimate of compliance costs for Phase II IDDE program of $1.30 per capita (with a staggering range $0.04 to $2.61/capita).

## Phase I IDDE Program Costs

The bulk of the cost for most IDDE programs is related to staffing – typically, about 75% of the total budget. Equipment costs were fairly reasonable, with programs spending a median of $1,000 on office computers and software, and about $4,000 on field equipment. Many equipment costs can typically be shared across other community programs. Lab costs, for either the purchase of lab equipment or the cost associated with sending samples to labs, were as high as $87,000 annually, with a median of $8,000. Finally, most programs had additional budgets for "other" which included items such as education, training, travel, consultants, and contractors.

It is worth noting that program costs presented in Table 9 do not reflect expenditures associated with special investigations, which may be pursued by communities to isolate specific sources or test new methods or the direct costs to fix problem connections. However, five communities provided data on typical correction costs, with an average cost of $2,500 per correction (Table 10).

## Estimated Phase II IDDE Program Unit Cost

Cost estimates for the eight IDDE program components are outlined in Table 11; more detailed guidance on budgeting for individual program components is provided in subsequent chapters. Under this presentation of cost, data, staff, equipment, and supply costs are combined and incorporated into a primary program element, such as conducting an outfall reconnaissance inventory. This approach assumes a hypothetical scenario of stream/MS4 miles and outfalls to investigate (see Table 11 notes).

| Table 9: Summary of Annual Phase I IDDE Program Costs ||
|---|---|
| **Program Element** | **Median Annual Cost** |
| Staff | $85,100 |
| Office Equipment (Computer/Software) | $1,000 |
| Field Equipment | $4,000 |
| Lab Equipment/Testing | $8,000 |
| Other | $10,000 |
| **Total** | **$121,825** |

| Table 10: Average Correction Costs ||
|---|---|
| **Jurisdiction** | **Average Cost Per Correction** |
| Cambridge, MA | $5,000 |
| Boston, MA | $3,570 |
| Knoxville, TN | $2,000 |
| Raleigh, NC | $1,000 |
| Springfield, MO | $1,000 |
| **Average** | **$2,500** |

| Table 11: IDDE Program Costs | | | | | |
|---|---|---|---|---|---|
| **IDDE Program Component** | | **Start Up Cost** | | **Annual Cost** | |
| | | **Low** | **High** | **Low** | **High** |
| Component 1: | a) Perform Audit | $3,000 | $9,000 | NA | NA |
| | b) Initial Program Plan | $1,000 | $3,000 | NA | NA |
| Component 2: | a) Adopt Ordinance | $1,000 | $17,000 | NA | NA |
| | b) Tracking System | $2,000 | $15,000 | $2,000 | $2,000 |
| Component 3: | a) Desktop Analysis | $1,000 | $4,000 | NA | NA |
| | b) Field Mapping | $500 | $1,000 | NA | NA |
| Component 4: | a) Develop Goals | $1,000 | $3,000 | NA | NA |
| | b) Field Monitoring Strategy | $1,000 | $3,000 | NA | NA |
| Component 5: | a) Outfall Reconnaissance Inventory (ORI) | NA | NA | $5,700 | $12,800 |
| | b) Establish Hotline | $1,300 | $7,700 | $1,500 | $11,400 |
| | c) Sample Analysis | $500 | $15,500 | $9,000 | $21,200 |
| | d) Outfall Map | NA | NA | $500 | $1,000 |
| Component 6: | a) Isolate | NA | NA | $2,000 | $5,200 |
| | b) Fix | NA | NA | $10,000 | $30,000 |
| Component 7: | a) Education | $1,000 | $8,100 | $1,300 | $13,900 |
| | b) Enforcement | NA | NA | $1,000 | $14,000 |
| Component 8: | a) Program Administration | $10,000 | $15,000 | $10,000 | $15,000 |
| **TOTAL** | | **$23,300** | **$101,300** | **$43,000** | **$126,500** |

*Notes:* NA = Not Applicable

Component 1 – Audit assumes $25/hr, 120 hours for low and 360 hrs for high. Program plan assumes 40 hrs for low and 120 hrs for high.

Component 2 – Ordinance low cost from Reese (2000), high cost from CWP (1998) adjusted and rounded for inflation (2002 $). Tracking system low cost assumes 40 hrs of development and $1K of equipment for start up. Annual cost for low assumes 40 hrs per year. High estimates are adapted from Reese (2000) and assume 200 hrs for development and $3k for equipment at start-up. High annual costs assume 100 hrs per year.

Component 3 – Desktop analysis assumes 1 week for low and 4 weeks for high. Mapping costs assume paper maps (CWP, 1998) under low and GIS under high (40 hrs)

Component 4 – Goals and strategies take 2 weeks for low and 6 weeks for high. Assume even split in time between two tasks.

Component 5 –

a) ORI costs are from Ch 11 and assume 10 miles with 2-person crew for low and 20 miles with 3-person crew for high. ORI costs assume work completed in one year, but not necessarily every year (permit cycle cost).

Low hotline costs are adapted from Reese (2000). High costs are from CWP research. Low annual costs assume an increased volume of calls due to advertisement and assume 50 hours per year dedicated to this plus annual training.

Sample analyses are from various sources and are presented in Chapter 12. Estimates based on 80 samples per year for both (shown as annual cost). Low start up costs are based on contract lab arrangements. High start up costs assume flow type library is developed for eight distinct flow types. Low annual costs assume in-house analysis for Flow Chart Method parameters. High annual costs assume contract lab analysis for 11 parameters.

Outfall map costs are same as the component 3 mapping task

Component 6 – Isolate and fix have no assumed start up costs and are both vary depending on the community conditions. Low annual isolation costs assume a one day investigation by a 2-person team per incident ($400) and four incidents per year plus $400 in equipment and supplies. High assumes one incident per month. Estimates include on-site inspections. Fix costs are from average costs from Phase I survey and assume same number of incidents as isolate. These costs can often be passed on to responsible parties.

Component 7 – Education estimate adapted from Reese (2000) and assumed to be 1/3 of total Phase I education budget. Some adjustments were made based on assumptions by CWP.

Component 8 – Low assumes 1/6 FTE, high assumes 1/4 FTE at an annual salary of $60K.

## *Financing an IDDE Program*

Once the initial budget has been estimated, the next step is to investigate how to pay for it. A full discussion of how to finance local storm water management programs is beyond the scope of this manual, but it is worth consulting APWA (2001). The most common financing mechanisms include:

- Operating budgets

- Debt financing

- State grants and revolving loans

- Property assessments

- Local improvement districts

- Wastewater utility fees

- Storm water utility or district fees

- Connection fees

- Plan review/inspection fees

- Water utility revenues

Of these, storm water utilities or districts are generally considered one of the best dedicated financing mechanisms. Some useful resources to consult to finance your local storm water programs include the following:

- An Internet Guide to Financing Storm Water Management. 2001 http://stormwaterfinance.urbancenter.iupui.edu

- Establishing a Storm Water Utility http://www.florida-stormwater.org/manual.html

- Florida Association of Storm Water Utilities.  http://www.fasu.org

- How to Create a Storm Water Utility http://www.epa.gov/nps/urban.html

- The Storm Water Utility: Will It Work in Your Community? www.forester.net/sw_0011_utility.html

## 3.10  The Initial IDDE Program Plan

The local IDDE audit reveals resource gaps, and expertise and staffing needed to build an effective IDDE program. The next step is to organize how you plan to phase in the eight program components over the permit cycle. The process results in the development of an initial IDDE program plan that normally includes five elements:

- Overall schedule for plan implementation, with milestones

- Detailed work plan for the first year

- Budget for the first year

- Five-year budget forecast

- Process for gaining approval for first-year budget

Program managers should consult the next seven chapters for more guidance on planning and budgeting individual IDDE program components.